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NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS.

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PRELIMINARY REPORT ON BRITISH COMMERCIAL AERONAUTICS.

Prepared for U. S. Army Air Service,  
by Lieut. J. Parker Van Zandt,  
July 8, 1924.

Washington,  
September, 1925.



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## NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS.

TECHNICAL MEMORANDUM NO. 328.

## PRELIMINARY REPORT ON BRITISH COMMERCIAL AERONAUTICS.\*

By J. Parker Van Zandt.

The writer arrived in England June 23d, and departed by air for France, July 9th. As the commercial aviation activities of England are virtually concentrated at Croydon Aerodrome, London, the writer moved to the Aerodrome Hotel and lived on the field during the major portion of his stay in England. This proved very advantageous in obtaining a good insight into the character of commercial activities.

## Historical

Air transportation activities in England were an outgrowth of the Royal Air Force Communications Squadron which operated in 1919, during the Paris Peace Conference. Several temporary arrangements were attempted between private companies and the Government during the first few years, but matters were not on a definite footing until March, 1921. Three companies were then in operation: Handley Page, The Instone Air Line, and Daimler Hire, largely competing among themselves as well as with the French, Belgian and Dutch lines.

When General Brancker became Director of Civil Aviation, the Cross Channel routes were allocated to the different companies in order to avoid competition, and subsidies were adjusted

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in accordance with the importance of the routes. The year following this arrangement was undoubtedly the most successful. During the summer of 1923, Handley Page, operating the London-Paris route, carried an unprecedented number of passengers (three-fourths of whom were American tourists). Instone, operating the line to Cologne, received a great artificial boom due to the presence of British troops in the occupied region and the cordon of French troops entirely surrounding the Cologne district. French officials practically blockaded the inhabitants of the Cologne district, not even excepting British subjects, so that it was almost impossible to export or import German goods except by air. Daimler Hire experienced political difficulties in opening the route beyond Amsterdam to Berlin, and the internal airway to Manchester quickly died out after a little flare-up of interest at its inception.

In the spring of 1924, these three companies amalgamated as Imperial Airways, Ltd., the government undertaking to pay a £1,000,000 subsidy over a ten-year period. Payment during the first four years is to be £137,000 and thereafter reducing by approximately £20,000 to a final payment in the tenth year of £32,000. The principal stipulation is that an average minimum yearly mileage of 1,000,000 miles be flown. The company was scheduled to begin operations April 1st, but was delayed five or six weeks by a strike of the pilots. This difficulty was partly one of salaries but more largely a question of the person-

ality of the general manager. The matter was finally compromised by adding to the executive staff an Air Superintendent, Major Brackley, who has direct supervision of the pilots.

The amalgamated company began operations in May, 1924, just at the beginning of the rush season and they can hardly be said to have yet settled down. With this loss of time, the main object of Imperial Airways is now to make up their scheduled mileage in order to be assured of receiving their subsidy, and all equipment is being flown to the very limit. Airplanes are in the air practically all day long, the maintenance being carried on with a night shift. Pilots are flying 50 to 100 hours a month and the great goal is to keep operating costs as low as possible while accumulating mileage.

### Equipment

Imperial Airways is operating approximately seven services daily, with three Handley Page W.8 airplanes equipped with two Rolls-Royce 360 HP. engines each, six D.H.-34's with Napier "Lion" engines, and two D.H.-50's with 240 HP. "Puma" engines. These last have just been acquired and are being put on the Berlin route. Stored in the tent hangars are two Bristol "Jupiters," a Vickers "Vulcan" with Jupiter engine, and two Handley Page O-400. These, I believe, are obsolete and not likely to be put in service again.

The Air Ministry has purchased from the Handley Page Company

a three-engined airplane (one Rolls and two "Pumas"), which it is now testing at Martlesham-Heath and will loan to the Imperial Airways Company, to try out on its commercial routes. This is an additional form of government aid which does not appear in the subsidy figures.

### Government Relations

Aside from the mileage subsidy granted the British company, the Government spends a large sum of money in a number of other ways. The entire field is Government owned and operated, hourly meteorological information is obtained, special lighting equipment installed on the field, and a rather intricate radio position finding system is operated, all at Government expense. The company itself does practically no experimental or development work. Its one object is to operate its airplanes at as low a cost as possible and it leaves all experimental work to the Air Ministry. As mentioned above, experimental types of airplanes are purchased and tested at the expense of the Government and not of the company. The radio, lighting, and other field equipment are described in paragraphs below.

### Operations

Engine maintenance is one of the highest unit expenses and every effort is being made to reduce this item. Gasoline and oil are relatively expensive, gasoline averaging roughly 2 shillings per gallon and oil 6 shillings. Salary scales in general are lower than in the United States, skilled mechanics getting between £200 and £350 per year. The traffic director receives

£600 per year and this is considered a rather munificent salary.

Aviation insurance is at the rate of 22%, which covers damage to airplanes, fire in the air or on the ground, and all third party liabilities. Cargo is insured separately as an additional charge to the client.

The depreciation reserve at 25% is in reality an obsolescence reserve, since it is claimed that the maintenance of the airplanes keeps them in practically new condition at all times. The entire nine airplanes (excluding the D.H. 50's which have just been acquired) have each had about 1500 hours in the air and yet appear to be as airworthy as ever and capable of indefinite use. It has been found that the airplane maintenance is a very low figure and the executives here are satisfied to continue using the stick and wire type of aircraft.

A very significant factor will be seen in the estimate for legal expenses, £500 total for the year, or no more than is set aside for telephone charges. The record of payments for lost and damaged cargo is extraordinarily low. Since January, 1921, there has been no passenger fatality on British cross-channel subsidized services. In the three calendar years, 1921 to 1923 inclusive, 26,693 paying passengers were carried. During these same three years one accident occurred in which goods were destroyed, a collision in France with a French airplane. The goods carried for 1921 were not recorded, but in 1922 the total was 182.8 tons, and in 1923, 306.4 tons. The value of the goods

for these three years, both exports and imports, was £2,060,571. In May, 1924, a D.H. 34 caught fire on take-off at Ostend and was destroyed. The total value of the goods on board was about £490. The insurance representative states their experience is that about 1% of the value of goods insured is claimed for loss, damage or other causes.

### Traffic

The majority of passengers travelling are Americans, roughly 75% on the London-Paris route, decreasing to 25% on the Amsterdam and Berlin route. It cannot be said that any important proportion of the passengers travelling do so regularly for business purposes. An aerial flight is still considered more or less of a stunt.

There are five reasons why goods travel by air, namely:

(1) Expedition through Air Customs.

Goods are cleared and delivered the same day through the Croydon Customs as against a possible fortnight's delay through the usual port customs.

(2) Safety from theft.

Small valuable parcels are brought to the aerodrome, can be seen placed on the airplane, and then are not disturbed until they come under observation again at the terminal field. Each package must be signed for, so that there is

little possibility of theft. On the other hand, travelling by boat or rail and through the big port customs, the theft hazard is very high. A great deal of wireless equipment, jewelery and other small articles travel by air because of this situation.

(3) Safety from Breakage.

Antique pictures, vases, etc., travel considerably by air, as well as perfumery and other breakable goods, in order to avoid special packing crates and to be assured of careful handling.

(4) Saving in Transit Time.

This saving in general is only of secondary importance to the expedition through the customs. Last summer when Handley Page was carrying full loads of passengers, his company routed air merchandise through the Croydon Customs officers and thence by rail and boat, under bond, to the Le Bourget field where it passed through the aerodrome customs and was delivered only a half day later than had it been sent by airplane. For this he charged the regular air rates and there is no record of complaints having been made.

(5) Saving in Insurance.

Insurance rates against theft are very much lower



by air than by rail and boat. It is impossible, I am told, to obtain theft insurance for goods travelling on German railroads at present. The heavy tonnage of goods shipped to Cologne, however, have gone through with practically zero loss due to pilferage. Insurance rates against other hazards appear to be slightly higher by air, but not enough to make this factor an important one.

Two days were spent going through the records of the Customs Office at Croydon to determine the character, sizes and values of the merchandise being shipped. Ladies' wearing apparel is probably the predominant shipment out of Paris. The Air Union has a large daily contract for perfumery shipments which travel by air because of customs, expedition and safety from breakage. About Easter time shipments in engine spare parts were very heavy and these shipments are continuing throughout the summer. Large shipments of wireless equipment, radio head phones, crystals, etc., come in from Holland. Heavy shipments of silver ingots and gold bullion have gone to Paris and Amsterdam. The K. L. M. sent one Fokker airplane with nothing but gold bullion, the total shipment being valued at about £400,000. The insurance rate on bullion shipments is generally 1 shilling 6 pence per £1000.

Tennis rackets, polo mallets, rowing oars, and goods of this character are being shipped between London and Paris dur-

ing the Olympic Games and other athletic contests. The average weight per package varies both with the season of the year and as to exports and imports. In general, the lighter goods come from Paris, the average weight per package being well under 20 lb. English exports may run considerably higher than this, the average weight being perhaps well over 30 lb. Airplanes occasionally come in filled to capacity with bulk but not with full weight. This is not a common occurrence, however, the cargo in general being sufficiently mixed. Probably a figure of 10 lb. per cu. ft. is a safe allowance, although many kinds of goods would average nearly 5 to 6 lb. per cu. ft.

#### General Conclusions

The character of commercial operations here and the character of its development appears to be entirely under the influence of the Air Ministry. The opinion is freely expressed by officials at the field that the policy of subsidy tends to retard a healthy development. The company receives during the next four years an average of 2 shillings 9 pence per flying mile without regard to the pay load carried or schedules maintained. Hence, the whole trend of policy is toward operating as cheaply as possible the greatest number of miles and letting the traffic put up with it as it will.

It is felt that the tourist traffic may be depended on without any special catering. As for the goods traffic, it has al-

ready been pointed out that the controlling factor in the large majority of cases is a matter of saving in time through customs rather than through flying time. We may therefore expect to see interesting developments in intensive flying with systematized maintenance, but no special emphasis on traffic requirements.

Practically all experimental and development work will come from the Air Ministry side as the company is intent on paying dividends and does not require traffic but rather subsidy miles to do this.

The trend of thought in radio is toward wing coils on the wings and the use of the Homing System in addition to the present method. They have been so intent on making the triangulation radio position method work that little progress seems to have been made in using more advanced methods.

The fog piercing light beacons are of interest and developments in equipment along this line may be expected.

The use of the recording tachometer for analyzing engine performance and predicting trouble is very promising and worth adopting.

The use of oleo landing gears is almost universal in British airplanes. These gears are said to give no maintenance trouble and appear to work splendidly.

In general, I would say that Commercial Air Transportation in Great Britain is somewhat strangled: first by its close relation to the Air Ministry and politics; second, by the interna-

tional complications involved in any extension of the routes; and third, by the unusually unfavorable weather (in the estimate of Imperial Airways, Ltd., 60 days of the year are taken as unflyable). On the other hand, air transportation is favored by, first, the Customs situation, which permits a special saving in time not inherent in air travel itself; second, by the presence of a large number of tourists, mostly Americans; and third, by the generally disrupted and more or less inefficient railroad communications on the Continent.

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